Electronic Supplementary Material (ESI) for Analyst

Supporting Information

Gold Nanoparticle-Enzyme Conjugates Based FRET for Highly Sensitive Determination of Hydrogen Peroxide, Glucose and Uric Acid Using Tyramide Reaction

Xiangyi Huang, Tao Lan, Bocheng Zhang, and Jicun Ren*[a]

College of Chemistry & Chemical Engineering, State Key Laboratory of Metal Matrix Composites, Shanghai Jiaotong University

E-mail: jicunren@sjtu.edu.cn

Supporting Figures:

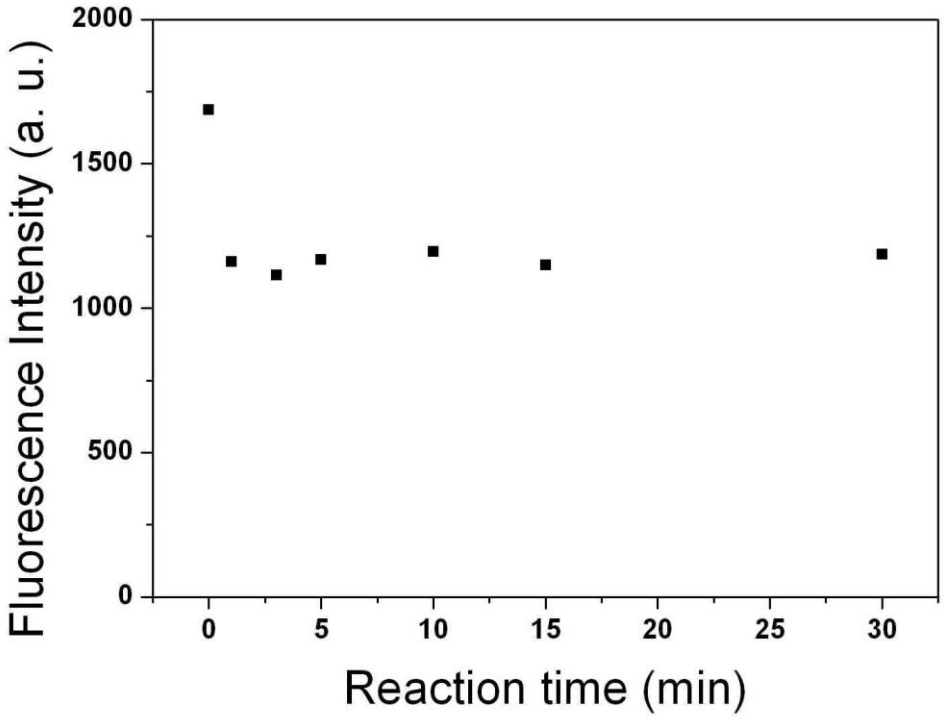

Figure S1 The relationship between the tyramide signal amplification reaction time and the TMR fluorescence intensity at 575 nm. The reaction solution consisted of 20 nM tyramide-TMR, 5.0 nM AuNP-HRP (13 nm AuNPs) conjugates in 100 mM Tris buffer (pH 7.5). To the reaction solution (180 μL), 20 μL of 4.0 μM H_2O_2 was added and incubated at room temperature for 10 min.

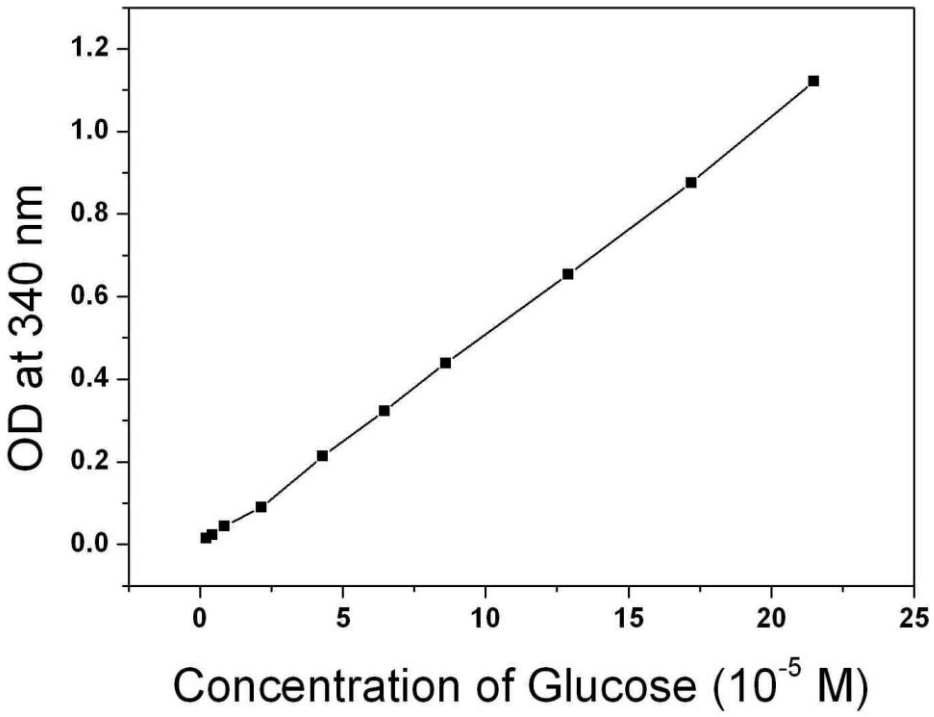

Figure S2 Linear relationship between the concentration of glucose and optical density at 340 nm using glucose/hexokinase assay kit. The measurements were performed according to the manufacturer's manual. We measured the absorbance of 340 nm using a UV/Vis-3501 spectrophotometer. The linear range of glucose is 2.15 $\times 10^{-6}$ M – 2.15 $\times 10^{-4}$ M (R = 0.999).

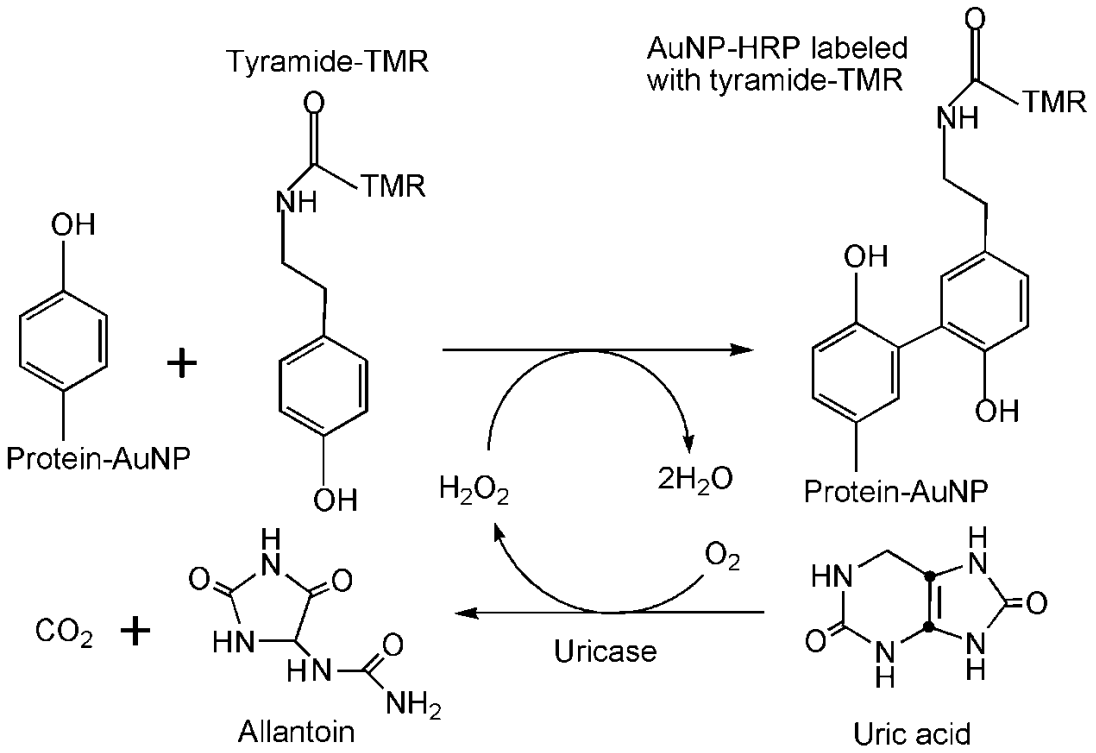

Figure S3 Scheme of the enzymatic reaction. This scheme shows binding between tyramide labeled with TMR and protein-AuNP conjugates by H_2O_2. Because the H_2O_2 concentrations correspond to the quenching of tyramide-TMR fluorescence signal, we can determine the concentrations of H_2O_2 by FRET. Proteins used in this experiment are HRP and BSA. Further, because H_2O_2 is produced by the reaction between uric acid and uricase, the concentrations of H_2O_2 can be determined and thus can deduce the concentrations of uric acid.

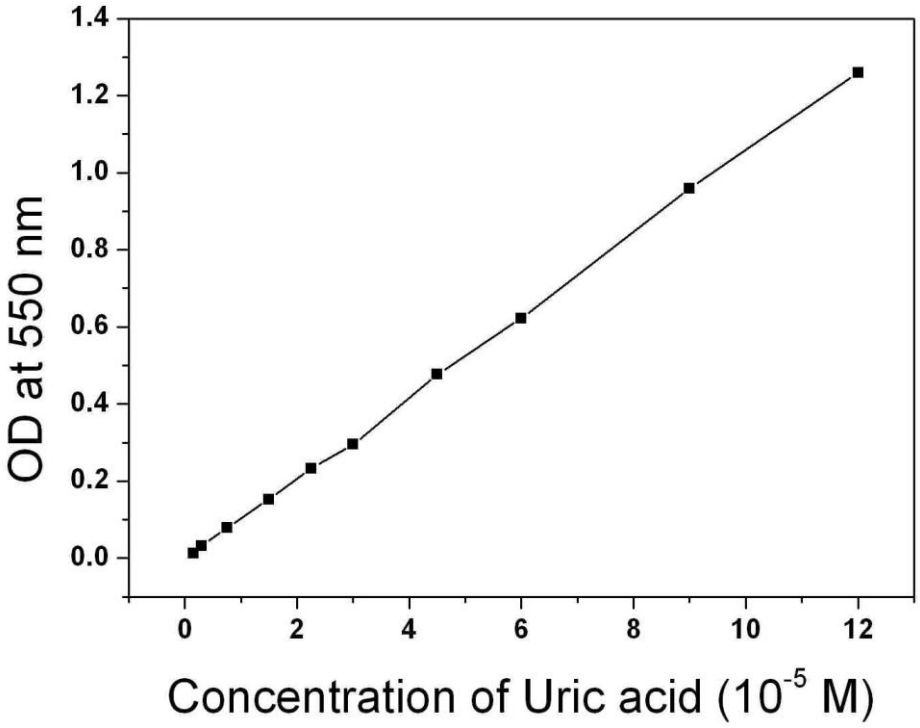

Figure S4 Linear relationship between the concentration of uric acid and optical density at 550 nm using uric acid/uricase-PAP assay kit. The measurements were performed according to the manufacturer's manual. We measured the absorbance of 550 nm using a UV/Vis-3501 spectrophotometer. The linear range of uric acid is 1.5 $\times 10^{-6}$ M – 1.2 $\times 10^{-4}$ M (R = 0.999).